Notice of Allowability	Application No.	Applicant(s)	
	10/751,396	NERVEGNA ET AL.	
	Examiner	Art Unit	
	Wilbert L. Starks, Jr.	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the filing of 01/05/2004*.

2. ☒ The allowed claim(s) is/are *25-52*.

3. ☒ The drawings filed on *05 January 2004* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Reasons For Allowance

1. Claims 25-52 are allowed.

2. The following is an Examiner's statement of reasons for allowance:

3. The cited prior art taken alone or in combination fails to teach the claimed invention of a model of a biological neuron, as claimed by Applicant. Specifically, independent claims 25 and 43 disclose a "membrane circuit" model in combination with a "synapse circuit" and a "dendrite circuit" and a "learning circuit." Note that the "membrane circuit" model is separate from the "synapse circuit" and models the membrane of a biological neuron. Independent claim 38 discloses a single "synapse circuit" model coupled to a "plurality of circuit means to provide a path through which said plurality of circuit means communicate and to modify synaptic conductance, said synapse circuit coupled to said circuit means through the corresponding dendrite circuit."

4. The closest prior art of Nervenga, et al[1] teaches the modeling of biological neurons, but fails to teach or suggest independent claims 25 and 43's disclosure of a "membrane circuit" model in combination with a "synapse circuit" and a "dendrite circuit"

and a "learning circuit." Note that the "membrane circuit" model is separate from the "synapse circuit" and models the membrane of a biological neuron. Nor does it teach independent claim 38's disclosure of a single "synapse circuit" model coupled to a "plurality of circuit means to provide a path through which said plurality of circuit means communicate and to modify synaptic conductance, said synapse circuit coupled to said circuit means through the corresponding dendrite circuit." To the extent that these features are not present in the prior art cited by Examiner, the present case is found by Examiner to be allowable over the art of record.

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A. Leonard, et al. (U.S. Patent 6,507,828; dated 14 January 2003; class 706; subclass 033) discloses a neuron circuit and related techniques.

B. McHardy; et al. (U.S. Patent 5,315,162; dated 24 May 1994; class 706; subclass 033) discloses electrochemical synapses for artificial neural networks.

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[1] Nervenga, et al. (U.S. Patent Number 6,687,686; dated 03 February 2004; class 706; subclass 015)

C. Minnaja (U.S. Patent 5,204,937; dated 20 April 1993; class 706; subclass 040) discloses a neural data-processing net with electrochromic material regions.

D. Hartstein (U.S. Patent 5,172,204; dated 15 December 1992; class 706; subclass 033) discloses an artificial ionic synapse.

E. Meijer (U.S. Patent 3,947,828; dated 30 March 1976; class 365; subclass 046) discloses an analog memory system using a temperature sensitive device.

7. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Wilbert L. Starks, Jr. whose telephone number is (571) 272-3691.

Alternatively, inquiries may be directed to the following:

S. P. E. Anthony Knight	**(571) 272-3687**
After-final (FAX)	**(703) 746-7238**
Official (FAX)	**(703) 746-7239**
Non-Official/Draft (FAX)	**(703) 746-7240**

WLS

11 December 2004

Wilbert L. Starks, Jr.
Primary Examiner
Art Unit - 2121